CLAIMS

What I claim is:

1. A predominantly metallic barrier separating oxygen containing gas and hydrogen containing gas, where at least a portion of the barrier contains fluidically connected pores leading from the barrier interior to the barrier surfaces.

2. The predominantly metallic barrier of claim 1 in which said fluidically connected pores lead to barrier surfaces contacted by hydrogen containing gas.

3. The predominantly metallic barrier of claim 1 in which said fluidically connected pores lead to barrier surfaces contacted by oxygen containing gas.

4. The predominantly metallic barrier of claim 1 in which a portion of said fluidically connected pores lead to barrier surfaces contacted by oxygen containing gas and a portion lead to barrier surfaces contacted by hydrogen containing gas.

5. The predominantly metallic barrier of claim 4 in which at least a portion of said fluidically connected pores extend from barrier surfaces contacted by oxygen containing gas to barrier surfaces contacted by hydrogen containing gas.

6. The predominantly metallic barrier of claim 1 in which at least a portion of said metallic content is a noble metal.

7. The predominantly metallic barrier of claim 6 in which the metal composition of at least the barrier surfaces contacted by oxygen containing gas is predominantly noble metal.

8. The predominantly metallic barrier of claim 7 in which the barrier surfaces contacted by hydrogen containing gas are predominantly non-noble metals including copper and nickel.

9. The predominantly metallic barrier of claim 1 in which at least a portion of the composition is particles of ceramic such as aluminia, zirconia or lanthanum chromite that are stable in both oxygen and hydrogen containing gases.

10. The predominantly metallic barrier of claim 1 in which a portion of the composition is particles of oxide such as copper oxide or nickel oxide that are stable in oxygen containing gases and are reduced to metal in hydrogen containing gases.

11. The predominantly metallic barrier of claim 1 in which a portion of the composition is particles of oxide such as copper oxide or nickel oxide that are stable in oxygen containing gases and are reduced to metal in hydrogen containing gases, and another portion of the composition is particles as aluminia, zirconia or lanthanum chromite that are stable in both oxygen and hydrogen containing gases.

12. A method of separating gas A from gas B with a barrier in which

A. Gasses A and B are both soluble in and diffuse through the barrier material;

B. gasses A and B react with each other within said barrier material to form a product gas C which is substantially insoluble in said barrier material;

C. said barrier contains connected pores leading to the surface of said barrier to vent said product gas C and limit the pressure of said product gas C within said barrier material.

13. The method of claim 12 wherein said gas A contains oxygen, said gas B contains hydrogen and said product gas C is steam.

14. The method of claim 12 wherein said barrier material is essentially inert relative to said gases A and B and said product C.

15. The method of claim 14 wherein the composition of said barrier material is varied according to the position within the barrier such that said gases A, B and product gas C only contact material inert to said gases A, B and product gas C respectively.

16. The method of claim 14 wherein at least a portion of said barrier material is electronically conductive metal.

17. The method of claim 16 wherein at least a portion of said electronically conductive metal is a noble metal.

18. The method of claim 14 wherein at least a portion of said barrier material is an oxide, ceramic or glass.

19. The method of claim 12 wherein the absolute pressure of said product gas C in a pore is higher than that of said gas A or gas B at the pore opening,

such that outward flow of said product gas C prevents entry of gasses A or B.

20. The method of claim 12 wherein the absolute pressure of said product gas C in a pore is below a level that causes structural damage to said barrier material.